

WHAT IS CLAIMED IS:

1                   1.       A stent-graft device for treating an abdominal aortic aneurysm, the  
2   stent-graft device comprising:  
3                   at least one stent member comprising at least one of a self-expanding stent  
4   member and a balloon-expandable stent member; and  
5                   at least one tubular graft member coupled with the at least one stent member,  
6   the tubular graft member having a proximal end and at least one distal end.

1                   2.       A stent-graft device as in claim 1, wherein at least one stent member  
2   comprises:  
3                   at least one self-expanding stent member; and  
4                   at least one balloon-expandable stent member coupled with the at least one  
5   self-expanding stent member.

1                   3.       A stent device as in claim 2, wherein the at least one self-expanding  
2   member and the at least one balloon-expandable member comprise a plurality of alternating  
3   members, every other alternating member comprising either a self-expanding material or a  
4   balloon-expandable material.

1                   4.       A stent-graft device as in claim 3, wherein the balloon-expandable  
2   material comprises stainless steel and the self-expanding material comprises nitinol.

1                   5.       A stent-graft device as in claim 3, wherein the alternating members are  
2   coupled together with one or more pieces of adhesive.

1                   6.       A stent-graft device as in claim 5, wherein the adhesive further couples  
2   the alternating members with the tubular graft member.

1                   7.       A stent-graft device as in claim 3, wherein the alternating members are  
2   coupled together via one of welding, soldering or tying.

1                   8.       A stent-graft device as in claim 3, wherein the alternating members  
2   comprise a plurality of diamond-shaped members coupled together to form a cylindrical  
3   stent.

1                   9.       A stent-graft device as in claim 1, wherein the at least one tubular graft  
2 member comprises:

3                   a main graft member toward the proximal end of the tubular graft member;  
4 and

5                   at least one leg having a proximal end and a distal end, each leg member being  
6 coupled with the main graft member at its proximal end and extending toward the distal end  
7 of the tubular graft member.

1                   10.     A stent-graft device as in claim 9, wherein the at least one leg member  
2 comprises two leg members for coupling the distal end of the tubular graft member with two  
3 iliac arteries branching from the abdominal aorta.

1                   11.     A stent-graft device as in claim 10, wherein the two leg members  
2 comprise two sinusoidal leg members.

1                   12.     A stent-graft device as in claim 11, wherein the two sinusoidal leg  
2 members are helically intertwined.

1                   13.     A stent-graft device as in claim 10, wherein each of the two leg  
2 members is coupled with an iliac stent member at its distal end.

1                   14.     A stent-graft device as in claim 17, wherein the iliac stent member  
2 comprises at least one of a self-expanding stent member and a balloon-expandable stent  
3 member.

1                   15.     A stent-graft device as in claim 10, wherein each of the two leg  
2 members is removably couplable with the main graft member.

1                   16.     A stent-graft device as in claim 9, wherein the main graft member is  
2 coupled with at least one stent member at the proximal end of the tubular graft member, and  
3 each of the at least one leg members is coupled with at least one stent member at the distal  
4 end of the tubular graft member.

1                   17.     A stent-graft device as in claim 9, further comprising a skirt graft  
2 member coupled with at least one of the main graft member and the stent member near the  
3 proximal end and extending toward the distal end.

1                   18.     A stent-graft device as in claim 1, further comprising a suprarenal  
2     anchoring member coupled with the stent member for anchoring the stent-graft device at a  
3     location superior to renal arteries branching from the abdominal aorta.

1                   19.     A stent-graft device as in claim 18, wherein the suprarenal anchoring  
2     member comprises at least one of a self-expanding stent member and a balloon expandable  
3     stent member.

1                   20.     A stent-graft device as in claim 18, wherein the suprarenal anchoring is  
2     coupled with at least one of the self-expanding stent member and the balloon expandable  
3     stent member by at least one connective member selected from the group consisting of wire,  
4     ribbon, rods and bands of material.

1                   21.     A stent-graft device as in claim 18, further comprising an infrarenal  
2     anchoring member coupled with at least one of the stent member and the suprarenal  
3     anchoring member for further anchoring the stent-graft device at a location inferior to the  
4     renal arteries.

1                   22.     A stent-graft device as in claim 21, wherein the infrarenal anchoring  
2     member comprises at least one of a self-expanding stent member and a balloon expandable  
3     stent member.

1                   23.     A stent-graft device as in claim 1, further comprising an infrarenal  
2     anchoring member for anchoring the stent-graft device at a location inferior to renal arteries  
3     branching from the abdominal aorta, the infrarenal anchoring member comprising at least one  
4     of a self-expanding member and a balloon-expandable member.

1                   24.     A stent-graft device as in claim 1, further comprising at least one  
2     expandable balloon member coupled with the at least one balloon-expandable stent member  
3     for expanding the balloon-expandable stent member.

1                   25.     A stent-graft device as in claim 1, further comprising at least one skirt  
2     graft member coupled with at least one of the stent member and the tubular graft member at  
3     or near the proximal end of the tubular graft member and extending toward the distal end.

1                   26.     A stent device for treating an aneurysm, the stent-graft device  
2 comprising:  
3                   at least one self-expanding stent member; and  
4                   at least one balloon-expandable stent member coupled with the self-expanding  
5 stent member.

1                   27.     A stent device as in claim 26, wherein the at least one self-expanding  
2 member and the at least one balloon-expandable member comprise a plurality of alternating  
3 members, every other alternating member comprising either a self-expanding material or a  
4 balloon-expandable material.

1                   28.     A stent-graft device as in claim 27, wherein the balloon-expandable  
2 material comprises stainless steel and the self-expanding material comprises nitinol.

1                   29.     A stent device as in claim 27, wherein the alternating members are  
2 coupled together with one or more pieces of adhesive.

1                   30.     A stent device as in claim 29, wherein stent device further comprises at  
2 least one tubular graft member and the adhesive further couples the alternating members with  
3 the tubular graft member.

1                   31.     A stent-graft device as in claim 27, wherein the alternating members  
2 are coupled together via one of welding, soldering or tying.

1                   32.     A stent-graft device as in claim 27, wherein the alternating members  
2 comprise a plurality of diamond-shaped members coupled together to form a cylindrical  
3 stent.

1                   33.     A stent-graft device for treating an abdominal aortic aneurysm, the  
2 stent-graft device comprising:  
3                   a proximal stent member for coupling the stent device with the abdominal  
4 aorta proximal to the aneurysm;  
5                   at least one distal stent member for coupling the stent device with a blood  
6 vessel distal to the aneurysm; and

7                   at least one graft member coupled with and extending between the proximal  
8   stent member and the at least one distal stent member, at least a portion of the graft member  
9   having a sinusoidal shape.

1                   34.     A stent-graft device as in claim 33, wherein the at least one distal stent  
2   member comprises two iliac stent members for coupling the stent-graft device with two iliac  
3   arteries branching from the abdominal aorta.

1                   35.     A stent-graft device as in claim 34, wherein the at least one graft  
2   member comprises:  
3                   a main graft member coupled with the proximal stent member; and  
4                   two leg members, each leg member coupled with the main graft member and  
5   one of the two iliac stent members.

1                   36.     A stent-graft device as in claim 34, wherein the at least one graft  
2   member comprises:  
3                   a main graft member coupled with the proximal stent member; and  
4                   two leg members, each leg member removably couplable with the main graft  
5   member and coupled with one of the two iliac stent members.

1                   37.     A stent-graft device as in claim 33, wherein at least one of the  
2   proximal stent member and the at least one distal stent member comprises:  
3                   at least one self-expanding stent member; and  
4                   at least one balloon expandable stent member coupled with the self-expanding  
5   stent member.

1                   38.     A stent-graft device as in claim 33, further comprising a suprarenal  
2   anchoring member coupled with the proximal stent member for anchoring the stent-graft  
3   device at a location superior to at least one renal artery branching from the aorta.

1                   39.     A stent-graft device as in claim 38, wherein the suprarenal anchoring  
2   member comprises at least one of a self-expanding member and a balloon expandable  
3   member.

1                   40.     A stent-graft device as in claim 33, further comprising at least one skirt  
2   member coupled with the proximal stent member and extending distally.

1                   41.     A kit for treating an abdominal aortic aneurysm, the kit comprising:  
2                   at least one stent-graft device for treating the aneurysm;  
3                   at least one stent-graft positioning device positioning the at least one stent-  
4 graft device in the abdominal aorta to treat the aneurysm; and  
5                   instructions for using the stent-graft device and the positioning device.

1                   42.     A method for treating an abdominal aortic aneurysm, the method  
2 comprising:  
3                   positioning at least one stent-graft device in the abdominal aorta in a location  
4 for treating the aneurysm, the at least one stent-graft device having at least one self-  
5 expanding member and at least one balloon-expandable member coupled to the self-  
6 expanding member; and  
7                   deploying the at least one stent-graft device to contact a portion of the  
8 abdominal aorta with at least a portion of the device.

1                   43.     A method as in claim 42, wherein positioning the at least one stent-  
2 graft device comprises positioning a proximal stent member at a location within the aorta  
3 inferior renal arteries which branch from the aorta and superior to the aneurysm.

1                   44.     A method as in claim 43, wherein positioning the at least one stent-  
2 graft device further comprises positioning at least one distal stent member at a location within  
3 at least one iliac artery of a patient.

1                   45.     A method as in claim 44, wherein positioning the at least one stent-  
2 graft device further comprises positioning at least one suprarenal anchoring member coupled  
3 with the at least one proximal stent member at a location within the aorta superior to the renal  
4 arteries.

1                   46.     A method as in claim 44, wherein positioning the at least one stent-  
2 graft device comprises positioning the device over at least one of a guidewire and a guide  
3 catheter.

1                   47.     A method as in claim 46, wherein positioning the device comprises  
2 positioning at least one helical leg portion of the device over at least one of the guidewire and  
3 the guide catheter.

1                   48.     A method as in claim 42, wherein deploying the at least one stent  
2 member comprises:  
3                   releasing the stent member from a containment member to allow the at least  
4 one self-expanding member to expand; and  
5                   expanding the at least one balloon-expandable member with an expandable  
6 balloon device.

1                   49.     A method as in claim 42, further comprising:  
2                   positioning a suprarenal anchoring member coupled with the stent-graft at a  
3 location within an aorta superior the renal arteries; and  
4                   releasing the suprarenal anchoring member from a containment member to  
5 allow the suprarenal anchoring member to expand and contact the wall of the aorta.

1                   50.     A method as in claim 42, further comprising adjusting the stent-graft  
2 member by expanding the at least one balloon-expandable member with a balloon expansion  
3 device.

1                   51.     A method as in claim 42, further comprising positioning a tubular graft  
2 member coupled with at least one of the self-expanding member and the balloon expandable  
3 member across at least part of the aneurysm.

1                   52.     A method as in claim 42, further comprising expanding a balloon  
2 member within at least part of the aneurysm.

1                   53.     A method as in claim 42, further comprising positioning a skirt member  
2 coupled with the stent-graft device within at least a portion of aneurysm.

1                   54.     A method as in claim 42, wherein the at least stent-graft device  
2 comprises a plurality of coupled members, each of the coupled members comprising either a  
3 balloon-expandable material or a self-expanding material.